Highlight results from Ulysses

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Launched in October 1990, the ESA-NASA Ulysses mission has conducted the very first survey of the heliosphere within 5 AU of the Sun over the full range of heliolatitudes. With polar passes taking place in 1994 and 1995, the timing of the mission has enabled Ulysses to characterise the global structure of the heliosphere at solar minimum, when the corona adopts its simplest configuration. The most important findings to date include a confirmation of the uniform nature of the high-speed ($\sim$750 km/s) solar wind flow from the polar coronal holes, filling two-thirds of the volume of the inner heliosphere; the sharp boundary, existing from the chromosphere through the corona, between fast and slow solar wind streams; the latitude independence of the radial component of the heliospheric magnetic field; the lower-than-expected latitude gradient of galactic and anomalous cosmic rays; the continued existence of recurrent increases in the flux of low-energy ions and electrons up to the highest latitudes. In this review, we will highlight some of these findings, and also look ahead to the challenges that await as Ulysses returns to high latitudes to explore the heliosphere at solar maximum.